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# **RURAL TELEPHONE BANK PRIVATIZATION STUDY FINANCIAL MODEL**

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## **RURAL TELEPHONE BANK FINANCIAL MODEL**

A financial model of the RTB was created, as both a Government agency and a privatized entity. It is a tool that uses algorithms to produce a statistically distributed range of financial results based on a large number of input variables. The output of the model includes pro forma financial statements based on standard accounting practices and the particular business scenario selected by the user. In addition, the model allows the user to understand which variables have the greatest impact on the estimated profitability of the privatized Bank using Monte Carlo simulation and sensitivity analysis.

The financial statements output by the model present operating results for three years before privatization and several years following privatization. At privatization, several changes occur to the RTB's assets, liabilities, equity, income, and expense accounts that are reflected in the model's output.

Some of the most significant input variables of the model include the timing and method of retiring Class A stock, lending rates, and lending volumes.

The model allows for three methods of retiring A stock:

1. retire with cash
2. retire with cash and issue debt
3. the Government abrogates the remaining outstanding Class A stock

With Class A stock, if method 1 is chosen all of the Class A stock will be retired with cash in a single year or over a multi-year period. If method 2 is selected, debt is issued and interest payments are made on the new debt. Method 3 simply eliminates the balance of Class A stock (or Treasury debt) and reports the change on the Bank's income statement as extraordinary income.

"Lending rates" is another set of major variables allowed by the model. The model allows the user to input a spread above the RTB's cost of money, which is based on the one-year risk-free rate and the twenty-year risk-free rate, for a number of different variables. Spreads on cash, Treasury debt and private debt reference the one-year risk-free rate and the twenty-year risk-free rate directly. By referencing the risk-free rates, the model takes into account prevailing market interest rates, which are designated by the user and may be easily found in the *Wall Street Journal*. Spreads above the Bank's cost of money are used to determine borrower rates on new loans.

"Lending volume" (loan advances) is another set of key variables. Annual loan advances for liquidating, financing, and other private loans may be input into the model by the user. For liquidating loans, the amount represents loan advances on liquidating loans before privatization, and loan advances on private liquidating loans after privatization. The same is true for financing loans. For new, private loans, a starting volume can be

input as well as a targeted volume after 10 years of private operations to show how the Bank could build up its loan portfolio over time.

The user can vary the Bank's administrative costs, corporate tax rate, and targeted debt to book value ratio. Additional variables influence the results of the model, with several included for designating asset, liability and equity balances at the beginning of the first year of the model run so that the model can be easily updated, allowing the Bank's latest internal financial information to serve as the starting point.

The output of the model includes a statement of operations or income statement, a balance sheet, a sources & uses of cash statement, and a statement of net interest spreads as some of the primary reports.

### **Model Details**

The financial model is in an MS Excel spreadsheet that contains more than fifty worksheets, but only a few are of interest to the user (the rest are used to manipulate data). The main worksheet is called "Home" (shown in the appendix). This is where the user can adjust input variables; perform a Monte Carlo simulation or sensitivity analysis; and print financial statements, background data, or charts. From the "Home" worksheet, the user can operate all of the functions of the financial model. The other key worksheets are "Summary\_data", "Sensitivity", and the worksheets for the financial statements:

- Balance Sheet\_data
- Statement of Operations\_data
- Statement of Net Cost\_data
- Sources and Uses of Cash\_data
- Net Interest Spread\_data
- Statement of Chg in Equity\_data
- Regulatory Capital Rqts\_data

The "Summary\_data" sheet presents summary results from performing a Monte Carlo simulation, while the "Sensitivity" sheet shows the results of performing a sensitivity analysis. The user may examine these worksheets on their computer screen, or simply enter one, two or three on the "Home" sheet where it says, "Designate source of input variables..." and press the *Print Financial Statements* button. The source of input variables is either those shown on the "Home" sheet, or those from the Monte Carlo simulation.

### **What changes occur to the financial accounts at privatization?**

The financial statements present three years before privatization and several years following privatization. At privatization, several changes occur to the RTB's assets, liabilities, equity, income and expense accounts.

As a government entity, the main assets are cash (the Treasury fund balance), liquidating loans receivable and finance loans receivable. At privatization, liquidating loans receivable becomes private liquidating loans receivable, while finance loans receivable becomes private finance loans receivable. Other asset accounts added at privatization are "other investments", "fixed assets", and "other assets". "Other investments" may earn interest income at a user-designated rate.

Liability accounts for the government entity include "accounts payable" and "Treasury debt", while the private entity adds the accounts "private debt, other", "private debt for retiring Treasury debt", and "private debt for retiring class A stock". While the government entity finances loan advances partly by Treasury debt, the private entity finances them partly through "private debt, other".

Equity accounts for the government entity are "class A stock", "class B stock", "class C stock", "restricted capital", and "patronage capital earned". As a private entity, the equity accounts are "class A stock", "common stock", "preferred stock", and "retained earnings". Class C stock becomes preferred, while class B stock becomes common.

Sources of income for the government entity include interest on cash, liquidating loans and financing loans; and fees for pre-payment and servicing. For the private entity, sources of income also include fees, interest on cash and interest on loans receivables: private liquidating loans, private financing loans, private other loans. In addition, extraordinary income may be earned through the unusual case of Congress repurchasing class A stock or paying down Treasury debt on behalf of the RTB.

Expenses also change as the RTB privatizes. As a government entity, expenses include interest on Treasury debt; class A stock dividends, the administrative cost of operations, and loan losses. As a private entity, additional expenses for interest on private debt and taxes are included.

All of the above changes to the financial accounts arrange the statements in a manner appropriate for a private entity. They are simply structural changes and have little effect on the estimated profitability of the private firm. The input variables determine the level of pro forma earnings estimated by the model.

### **What input variables are included in the model?**

As described in general terms in the Statement of Work, and more succinctly in the *Rural Telephone Bank Financial Model Specification*, input variables include the timing and method of retiring class A stock; the timing and method of retiring Treasury debt; lending

rates and volumes; administrative cost of operations; and other minor variables. These are listed on the "Home" sheet and may be adjusted by entering "constant" and a number in the two yellow shaded cells next to each variable. When using the Monte Carlo simulation, input variables that are designated as "random" are changed automatically by the computer within the user designated range.

At the top of the "Home" sheet are the variables for retiring A stock. The user may select between three methods of retiring A stock:

- retire with cash
- retire with cash and issue debt
- retire with cash and Congress abrogates the remaining outstanding class A stock

Similar methods for retiring Treasury debt are also shown:

- retire with cash
- retire with debt
- Congress abrogates Treasury debt

With class A stock, some amount of cash is used to pay it down, even when methods two or three are selected (at least 13.3% of class A stock must be repurchased each year in order to meet the privatization requirement of 50%). If method two is selected, debt is issued and interest payments must be made on the balance. Method three simply eliminates the balance of class A stock (or Treasury debt) via extraordinary income.

Below the input variables for retiring Treasury debt are those for lending rates on loans. For each lending rate, the user enters a spread above the firm's cost of money, which is based on the one-year risk-free rate and the twenty-year risk-free rate. Spreads on cash, Treasury debt and private debt reference the one-year risk-free rate and the twenty-year risk-free rate directly. By referencing the risk-free rates, the model takes into account prevailing market interest rates, which are designated by the user and may be easily found in the *Wall Street Journal*. The spread on "private loans, liquidating" are for those loans that transfer to the private entity from the liquidating loans account, after privatization. The same is true for the "private loans, financing" account. The spread on "private loans, other" are for new loans that do not include any loans receivable transferred from the government entity.

Below the variables for lending rates are the variables for lending volume (loan advances). Annual loan advances for liquidating, financing and other private loans may be entered. For liquidating loans, the number entered represents loan advances on liquidating loans before privatization, and loan advances on private liquidating loans after privatization. The same is true for financing loans. Annual loan advances for "private loans other" are designated by entering an amount for the fourth year of the model and



one for the thirteenth year. Loan advances for "private loans other" will then steadily grow from that listed for the fourth year to the thirteenth.

Additional variables are listed below those for the loan advances, with several for designating asset, liability and equity balances at the beginning of the first year of the model. This gives the model a starting point.

### **What does the Monte Carlo simulation do?**

The Monte Carlo simulation automatically changes values for the input variables, and calculates a discounted cash flow estimate of the pro forma cash flows each time. The simulation then saves the financial statements for the highest estimate and lowest estimate. To view the results, the user must enter two or three on the "Home" sheet where it says, "Designate source of input variables..." and press the print button. The results of a Monte Carlo simulation are summarized on the "Summary\_data" sheet.

### **What does the sensitivity analysis do?**

The sensitivity analysis changes each variable, one at a time, and records the effect on the discounted cash flow estimate. The resulting list of input variables and their effect indicates which ones influence the estimated pro forma financial statements the most. The sensitivity analysis is presented on the "Sensitivity" sheet.

### **What are the purposes of background worksheets?**

The background worksheets are those that are listed to the right of the tab, "Background data->". Their purpose is to store and calculate the financial data. While there are more than fifty background worksheets, many of them are used just to store the two Monte Carlo simulation results, one where the profitability is high and one where it is low. However, there are nineteen worksheets that are key to producing the pro forma financial statements and warrant a short description:

- VariableSelect\_data: all of the user inputs are passed from the Home sheet to this sheet when the source is designated "1". When the source is designated "2" or "3", VariableSelect\_data receives data from the Monte Carlo simulation results. The pro forma financial statements and charts receive their data from this sheet.
- ActualVals\_data: indicates the annual data from the VariableSelect\_data sheet that is being used to generate the pro forma financial statements.
- CNP\_dat: lists historical data from the changes in net position statement
- CostMoney\_data: calculates the cost of money for liquidating, financing and private loans based on the various financing costs for each.
- V\_data: lists the discounted cash flow (DCF) estimate, which is based on the leveraged free cash flows for years four through thirteen. The maximum and minimum DCF estimates determine the Monte Carlo high and low cases.

- Achange\_data: lists increasing assets and how they are financed. This data is passed to the CostMoney\_data sheet.
- ABal\_data: maintains asset balances.
- IntRate\_data: calculates the interest rate for fixed rate loans.
- AInc\_data: calculates interest on assets.
- PPmt\_data: calculates pre-payment income based on pre-payments and the input variables for fees.
- SubsidyCost\_data: lists historical subsidy cost data.
- LBal\_data: maintains liability balances.
- LInc\_data: calculates interest on liabilities.
- YieldCurve\_data: lists risk-free rates for one and twenty year maturities.
- Prvt Rates\_data: lists lending rates on loans, interest on cash and interest on debt for each year.
- V\_cht: chart of discounted cash flow estimates from the latest Monte Carlo simulation.
- V\_mc: data for the V\_cht chart.
- \*\_low: sheets with the suffix, "\_low", contain all of the data for the low case from the Monte Carlo simulation.
- \*\_high: sheets with the suffix, "\_high", contain all of the data for the high case from the Monte Carlo simulation.

Table 1 shows the input worksheet for the model.

**Table 1. Financial Model Input Sheet**

Home Sheet - RTB Financial Model

1) Enter parameters for the input variables in the yellow shaded cells and check that they are accepted to the right, under "Check Input". (Dollars in thousands)

Input Variables	Input Variable Parameters		
	Constant or Random?	Value if Constant	Possible Values if Random (Monte Carlo Simulation) Minimum Maximum
<b>Method of Class A Stock Retirement (1, 2, or 3)</b>	constant	1	1 2
<b>Method 1: Cash</b>			
Class A Stock repurchased annually with cash as	constant	9.20%	9.00% 100.00%
Class A Stock repurchased, Yr 1		54,473	
Class A Stock at end of Yr 3 as percentage of \$592.1M		48.9%	
**Privatization achieved in year three!**			
<b>Method 2: Cash and Issue Debt</b>			
Additional debt issued for replacement of Class A Stock in	constant	4	1 5
Spread on bond issued for retiring A stock	constant	1.00%	1.00% 3.00%
Fixed Interest rate on bond		6.18%	
Class A Stock repurchased annually with cash as		9.20%	9.00% 100.00%
<b>Method 3: Cash and Congress Abrogates Class A Stock</b>			
Class A Stock abrogated by Congress in year? (1 to 5)	constant	4	1 5
Class A Stock repurchased annually with cash as		9.20%	9.00% 100.00%
<b>Method of Retiring Treasury Debt (1, 2, or 3)</b>	constant	1	1 2
<b>Method 1: Cash</b>			
Treasury Debt retired gradually over 30 year(s)			
Start year	constant	1	1 4
End year	constant	30	4 5
<b>Method 2: Issue Debt</b>			
Additional debt issued for replacement of Treasury Debt in	constant	4	4 5
Spread on bond issued for retiring Treasury debt	constant	2.00%	1.00% 3.00%
Fixed Interest rate on bond		7.18%	
<b>Method 3: Abrogate</b>			
Congress abrogates Treasury debt in year?	constant	4	3 5
<b>Lending Rates</b>			
Spread on Liquidating Loans	constant	1.00%	0.00% 2.00%
Cost of Money, liquidating loans		5.88%	
Lending Rate, Liquidating Loans, (yr 2 shown)		6.88%	
Spread on Financing Loans	constant	0.00%	0.00% 5.00%
Cost of Money, financing loans		5.74%	
Lending Rate, Financing Loans, (yr 2 shown)		5.74%	
Service fee on Private Loans, liquidating	constant	0.00%	0.00% 4.00%
Cost of Money, private (yr 4 shown)		5.89%	
Lending Rate, Private Liquidating Loans		5.89%	
Service fee on Private Loans, financing	constant	0.00%	0.00% 4.00%
Cost of Money, private (yr 4 shown)		5.89%	
Lending Rate, Private Financing Loans		5.89%	
Spread on Private Loans, other	constant	1.00%	0.00% 4.00%
Interest rate on Private Debt		6.48%	
Lending Rate, Other Private Loans		7.48%	
Spread on Cash	constant	1.25%	-1.75% 1.25%
Risk-free rate, 1 yr		1.73%	
Interest Rate on Cash		2.98%	
Spread above risk-free rate for Treasury Debt	constant	1.30%	0.00% 2.00%
Risk-free rate, 20 yr		5.18%	
Interest rate on Treasury Debt		6.48%	
Spread above risk-free rate for Private Debt	constant	1.30%	0.00% 2.00%
Risk-free rate, 20 yr		5.18%	
Interest rate on Private Debt		6.48%	

Table 1. Financial Model Input Sheet (continued)

<b>Annual Lending Volume</b>			
Loan advances, liquidating	constant \$	6,000	\$ - \$ 10,000
Loan advances, financing	constant \$	20,000	\$ - \$ 10,000
Loan advances, private loans other, in the 4th year	constant \$	84,000	
Loan advances, private loans other, in the 13th year (loan	constant \$	350,000	\$ - \$ 50,000
Private loans receivable at the end of the 13th year		1,962,367	
Pre-Private Administrative Cost of Operations as % of Total	constant	5.00%	1% 10%
Dollar equivalent for year 1		3,791	
Private Administrative Cost of Operations as % of non-cash assets	constant	1.50%	1% 10%
Dollar equivalent for year 4		15,035	
Annual percentage of Class B Stock converted to Class C	constant	10.00%	5.00% 15.00%
Marginal Corporate Tax Rate	constant	0%	20% 50%
Target Debt to Book Value Ratio	constant	50%	10% 35%
Debt to Book Ratio at end of 2001		14%	
Pre-payment penalty as % of pre-payment, pre and post	constant	0.00%	0.00% 5.00%
% Class B Stock repurchased with cash in year 4	constant	0%	0% 100%
% Class B Stock exchanged for common stock in year 4		100%	
Class C Stock annual issues	constant	-	\$ - \$ 20,000
% Class C Stock repurchased with cash in year 4	constant	0%	0% 100%
% Class C Stock exchanged for common stock in year 4		100%	
Common Stock issues, borrower's requirement as % of	constant	0.00%	0.00% 10.00%
Dividends %, Class A Stock	constant	2.00%	2.00% 2.00%
Dividends, Class A Stock		7,968	
Dividends %, Class C Stock	constant	5.45%	0.00% 10.00%
Dividends, Class C Stock		28,509	
Dividends %, Common Stock	constant	2.00%	0.00% 10.00%
Dividends, Common Stock		-	
Dividends %, Preferred Stock	constant	0.00%	0.00% 10.00%
Dividends, Preferred Stock		-	
Pre-pmt, liquidating	constant	1.00%	0.00% 5.00%
Allowance for Credit Program Receivables (NRV)	constant	0.70%	0.00% 1.00%
Pre-pmt, financing	constant	1.00%	0.00% 5.00%
Allowance for Credit Program Receivables, financing	constant \$	20,000	\$ 25,000 \$ 35,000
20 yr fixed rate	constant	100%	
20 yr variable rate	constant	0%	
Other Investments as % of previous year's assets	constant	0.00%	0.00% 20.00%
Spread on Other Investments	constant	2.00%	0.00% 2.00%
Risk-free rate, 1 yr		1.73%	
Interest Rate on Other Investments		3.73%	
Fixed Assets as % of previous year's assets	constant	0.25%	0.00% 20.00%
Other Assets as % of previous year's assets	constant	0.00%	0.00% 20.00%
Cash requirement as % of outstanding loans	constant	15.00%	0.00% 20.00%
<b>Equity</b>			
Unexpended Appropriations	constant \$	19,115	\$ - \$ 20,000
Subsidy Re-estimates	constant \$	(4,195)	\$ (10,000) \$ 10,000
Increase (Decrease) in Restricted Capital	constant \$	-	\$ (100) \$ 100
<i>Private pre-payment as percentage of loan balance</i>			
% Pre-payments, All Private Loans	constant	0.00%	0.00% 5.00%

**Table 1. Financial Model Input Sheet (continued)**

<b>Input Variables: Balances at the start of Year 1</b>		Balance at the			
<b>Assets</b>					
Fund Balance with Treasury, start YR 1	904,651	constant	\$ 904,651	\$ -	\$ 1,000,000
Gross Loans Receivable, liquidating, start YR 1	791,274	constant	\$ 793,902	\$ -	\$ 1,000,000
Gross Loans Receivable, financing, start YR 1	293,434	constant	\$ 290,795	\$ -	\$ 1,000,000
Credit Program Receivables, liquidating	788,388	constant	\$ 791,015	\$ -	\$ 1,000,000
Credit Program Receivables, financing	281,295	constant	\$ 278,656	\$ -	\$ 1,000,000
<b>Liabilities</b>					
	1				
Accounts Payable, start YR 1	3,118	constant	\$ 3,118	\$ -	\$ 1,000,000
Treasury Debt, start YR 1	272,734	constant	\$ 272,734	\$ -	\$ 1,000,000
Other Liabilities, start YR 1	20,676	constant	\$ 20,676	\$ -	\$ 1,000,000
<b>Equity</b>					
Unexpended Appropriations, start YR 1	19,115	constant	\$ 19,115	\$ -	\$ 1,000,000
Class A Stock, start YR 1	452,865	constant	\$ 452,865	\$ -	\$ 1,000,000
Subsidy Re-estimates, start YR 1	(4,395)	constant	\$ (4,395)	\$ -	\$ 1,000,000
Class B Stock, start YR 1	666,742	constant	\$ 666,731	\$ -	\$ 1,000,000
Class C Stock, start YR 1	447,722	constant	\$ 447,722	\$ -	\$ 1,000,000
Restricted Capital, start YR 1	10,000	constant	\$ 10,000	\$ -	\$ 1,000,000
Patronage Capital Earned, start YR 1	85,756	constant	\$ 85,756	\$ -	\$ 1,000,000